AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Original) A variable-frequency pulse generator which executes one cycle of output control of the pulse train by two cycles of a reference clock, comprising:

an inversion unit which inverts a first reference value regulated by the reference clock;

a selection unit which selects the first reference value after inversion, when an overflow has occurred, and in any other event selects a predetermined value which changes depending on a set speed;

a data holding unit which latches an output of a previous stage, being the present value of a result of addition, in the second cycle of the reference clock and at a predetermined timing of an overflow prevention signal;

an addition unit which adds the value selected by the selection unit and the data latched by the data holding unit;

a first comparison unit which compares the value obtained by the addition unit as a result of addition and the first reference value;

a second comparison unit which compares the value obtained by the addition unit as a result of addition and a second reference value which is half of the first reference value;

a judgment unit which judges whether a condition "$0 \leq$ addition result $<$ second reference value" is satisfied, or whether a condition "second reference value $\leq$ addition result $<$ first

reference value" is satisfied, or whether a condition "first reference value $\leq$ addition result" is satisfied, and outputs a specified signal corresponding to a result of the judgment;

a pulse train output unit which latches the specified signal at a predetermined timing of the second cycle of the reference clock, and outputs a pulse train of a desired frequency;

a third comparison unit which compares the data latched by the data holding unit and the first reference value, and when a condition "latched data $\geq$ first reference value" is satisfied, judges that the overflow has occurred; and

an overflow prevention unit which outputs the overflow prevention signal at a predetermined timing of the first cycle of the reference clock, when the third comparison unit has judged that the overflow has occurred.

2. (Original) A variable-frequency pulse generator which executes one cycle of output control of the pulse train by two cycles of a reference clock, comprising:

an addition unit which adds a predetermined value, which changes depending on a set speed, and data latched at a predetermined timing of the second cycle of the reference clock;

a subtraction unit which subtracts a first reference value regulated by the reference clock from the value obtained by the addition unit as a result of addition;

a first comparison unit which compares the value obtained by the addition unit as a result of addition and the first reference value, and when a condition "addition result $\geq$ first reference value" is satisfied, judges that an overflow has occurred;

a second comparison unit which compares the value obtained by the addition unit as a result of addition and a second reference value which is half of the first reference value;

a selection unit which selects the value obtained by the subtraction unit as a result of subtraction when the overflow has occurred, and in any other event selects the value obtained by the addition unit as a result of addition;

a data holding unit which latches the value selected by the selection unit at a predetermined timing of the second cycle of the reference clock;

a judgment unit which judges based on each the results of comparisons in the first comparison unit and the second comparison unit, whether a condition " $0 \leq$ addition result < second reference value" is satisfied, or whether a condition "second reference value $\leq$ addition result <first reference value" is satisfied, or whether a condition "first reference value $\leq$ addition result" is satisfied, and outputs a specified signal according to a result of the judgment; and

a pulse train output unit which latches the specified signal at a predetermined timing of the second cycle of the reference clock, and outputs a pulse train of a desired frequency.

3. (Original) A variable-frequency pulse generator which executes one cycle of output control of the pulse train by two cycles of a reference clock, comprising:

an inversion unit which inverts a reference value regulated by the reference clock;

a selection unit which selects the reference value after inversion, when an overflow has occurred, and in any other event selects a predetermined value which changes depending on a set speed;

a data holding unit which latches an output of a previous stage, being the present value of a result of addition, in the second cycle of the reference clock and at a predetermined timing of an overflow prevention signal;

an addition unit which adds the value selected by the selection unit and the data latched by the data holding unit;

a first comparison unit which compares the value obtained by the addition unit as a result of addition and the reference value;

a judgment unit which judges whether a condition "the overflow frequency is an even number" and "0 $\leq$ addition result < reference value" is satisfied, or whether a condition "the overflow frequency is an even number" and "reference value $\leq$ addition result" is satisfied, or whether conditions "the overflow frequency is an odd number" and "0 $\leq$ addition result < reference value" are satisfied, or whether conditions "the overflow frequency is an odd number" and "reference value $\leq$ addition result" are satisfied, and outputs a specified signal corresponding to a result of the judgment;

a pulse train output unit which latches the specified signal at a predetermined timing of the second cycle of the reference clock, and outputs a pulse train of a desired frequency;

a second comparison unit which compares the data latched by the data holding unit and the reference value, and when a condition "latched data $\geq$ reference value" is satisfied, judges that the overflow has occurred; and

an overflow prevention unit which outputs the overflow prevention signal at a predetermined timing of the first cycle of the reference clock, when the second comparison unit has judged that the overflow has occurred.

4. (Original) A variable-frequency pulse generator which executes one cycle of output control of the pulse train by two cycles of a reference clock, comprising:

an inversion unit which inverts a first reference value regulated by the reference clock;

a selection unit which selects the first reference value after inversion, when an overflow has occurred, and in any other event selects a predetermined value which changes depending on a set speed;

a data holding unit which latches an output of a previous stage, being the present value of a result of addition, in the second cycle of the reference clock and at a predetermined timing of the overflow prevention signal;

an addition unit which adds the value selected by the selection unit and the data latched by the data holding unit;

a first comparison unit which compares the value obtained by the addition unit as a result of addition and the first reference value;

a second comparison unit which compares the value obtained by the addition unit as a result of addition and a second reference value which is half of the first reference value;

a judgment unit which judges whether a condition "$0 \leq$ addition result $<$ second reference value" is satisfied, or whether a condition "second reference value $\leq$ addition result $<$ first reference value" is satisfied, or whether a condition "first reference value $\leq$ addition result $<$ (second reference value x 3)" is satisfied, or whether a condition "(second reference value x 3) $\leq$ addition result" is satisfied, and outputs a specified signal corresponding to a result of the judgment;

a pulse train output unit which latches the specified signal at a predetermined timing of the second cycle of the reference clock, and outputs a pulse train of a desired frequency;

a third comparison unit which compares the data latched by the data holding unit and the first reference value, and when a condition "latched data > first reference value" is satisfied, judges that the overflow has occurred; and

an overflow prevention unit which outputs the overflow prevention signal at a predetermined timing of the first cycle of the reference clock, when the third comparison unit has judged that the overflow has occurred.

5. (New) A variable-frequency pulse generator which executes one cycle of output control of the pulse train by two cycles of a reference clock, comprising:

an inversion unit which inverts a first reference value regulated by the reference clock;

a selection unit which selects the first reference value after inversion, when an overflow has occurred, and in any other event selects a predetermined value which changes depending on a set speed;

a data holding unit which latches an output of a previous stage, being the present value of a result of addition, in the second cycle of the reference clock and at a predetermined timing of an overflow prevention signal;

an addition unit which adds the value selected by the selection unit and the data latched by the data holding unit;

a first comparison unit which compares the value obtained by the addition unit as a result of addition and the first reference value;

a second comparison unit which compares the value obtained by the addition unit as a result of addition and a second reference value which is a portion of the first reference value;

a judgment unit which judges whether a first, second or third condition is satisfied, and outputs a specified signal corresponding to a result of the judgment; and

a pulse train output unit which latches the specified signal at a predetermined timing of the second cycle of the reference clock, and outputs a pulse train of a desired frequency.

6. (New) The variable-frequency pulse generator of claim 5, wherein the second reference value is half of the first reference value.

7. (New) The variable-frequency pulse generator of claim 5, further comprising a third comparison unit which compares the data latched by the data holding unit and the first reference value, and when a fourth condition is satisfied, judges that the overflow has occurred.

8. (New) The variable-frequency pulse generator of claim 7, further comprising an overflow prevention unit which outputs the overflow prevention signal at a predetermined timing of the first cycle of the reference clock, when the third comparison unit has judged that the overflow has occurred.

9. (New) The variable-frequency pulse generator of claim 5, wherein said first condition is a $0 \leq$ addition result $<$ second reference value condition, the second condition is a second reference value $\leq$ addition result $<$ first reference value, and the third condition is a first reference value $\leq$ addition result condition.

10. (New) The variable-frequency pulse generator of claim 7, wherein said fourth condition is a latched data $\geq$ first reference value condition.

11. (New) A variable-frequency pulse generator which executes one cycle of output control of the pulse train by two cycles of a reference clock, comprising:

an addition unit which adds a predetermined value, which changes depending on a set speed, and data latched at a predetermined timing of the second cycle of the reference clock;

a subtraction unit which subtracts a first reference value regulated by the reference clock from the value obtained by the addition unit as a result of addition;

a first comparison unit which compares the value obtained by the addition unit as a result of addition and the first reference value, and when a first condition is satisfied, judges that an overflow has occurred;

a second comparison unit which compares the value obtained by the addition unit as a result of addition and a second reference value which is a portion of the first reference value;

a selection unit which selects the value obtained by the subtraction unit as a result of subtraction when the overflow has occurred, and in any other event selects the value obtained by the addition unit as a result of addition;

a data holding unit which latches the value selected by the selection unit at a predetermined timing of the second cycle of the reference clock;

a judgment unit which judges based on the results of at least one of the comparisons in the first comparison unit and the second comparison unit, whether a second, third or fourth condition is satisfied, and outputs a specified signal according to a result of the judgment; and

a pulse train output unit which latches the specified signal at a predetermined timing of the second cycle of the reference clock, and outputs a pulse train of a desired frequency.

12. (New) The variable-frequency pulse generator of claim 11, wherein said first condition is an addition result $\geq$ first reference value condition.

13. (New) The variable-frequency pulse generator of claim 11, wherein said second reference value is half of said first reference value.

14. (New) The variable-frequency pulse generator of claim 11, wherein the judgment unit judges based on each of the results of comparisons in the first and second comparison units.

15. (New) The variable-frequency pulse generator of claim 11, wherein said second condition is a $0 \leq$ addition result $<$ second reference value condition, said third condition is a second reference value $\leq$ addition result $<$first reference value condition, and said fourth condition is a first reference value $\leq$ addition result condition.

16. (New) A variable-frequency pulse generator which executes one cycle of output control of the pulse train by two cycles of a reference clock, comprising:

an inversion unit which inverts a reference value regulated by the reference clock;

a selection unit which selects the reference value after inversion, when an overflow has occurred, and in any other event selects a predetermined value which changes depending on a set speed;

a data holding unit which latches an output of a previous stage, being the present value of a result of addition, in the second cycle of the reference clock and at a predetermined timing of an overflow prevention signal;

an addition unit which adds the value selected by the selection unit and the data latched by the data holding unit;

a first comparison unit which compares the value obtained by the addition unit as a result of addition and the reference value;

a judgment unit which judges whether a first, second, third or fourth condition are satisfied, and outputs a specified signal corresponding to a result of the judgment; and

a pulse train output unit which latches the specified signal at a predetermined timing of the second cycle of the reference clock, and outputs a pulse train of a desired frequency.

17. (New) The variable-frequency pulse generator of claim 16, wherein said first condition is a condition where an overflow frequency is an even number and $0 \leq$ addition result $<$ reference value, said second condition is a condition where said overflow frequency is an even number and reference value $\leq$ addition result, said third condition is a condition where the overflow frequency is an odd number and $0 \leq$ addition result $<$ reference value, and said fourth condition is a condition where the overflow frequency is an odd number and reference value $\leq$ addition result.

18. (New) The variable-frequency pulse generator of claim 16, further comprising a second comparison unit which compares the data latched by the data holding unit and the reference value, and when a fifth condition is satisfied, judges that the overflow has occurred.

19. (New) The variable frequency pulse generator of claim 18, wherein said fifth condition is a latched data $\geq$ reference value condition.

20. (New) The variable-frequency pulse generator of claim 18, further comprising an overflow prevention unit which outputs the overflow prevention signal at a predetermined timing of the first cycle of the reference clock, when the second comparison unit has judged that the overflow has occurred.

21. (New) A variable-frequency pulse generator which executes one cycle of output control of the pulse train by two cycles of a reference clock, comprising:

an inversion unit which inverts a first reference value regulated by the reference clock;

a selection unit which selects the first reference value after inversion, when an overflow has occurred, and in any other event selects a predetermined value which changes depending on a set speed;

a data holding unit which latches an output of a previous stage, being the present value of a result of addition, in the second cycle of the reference clock and at a predetermined timing of the overflow prevention signal;

an addition unit which adds the value selected by the selection unit and the data latched by the data holding unit;

a first comparison unit which compares the value obtained by the addition unit as a result of addition and the first reference value;

a second comparison unit which compares the value obtained by the addition unit as a result of addition and a second reference value which is a portion of the first reference value;

a judgment unit which judges whether a first, second, third or fourth condition is satisfied, and outputs a specified signal corresponding to a result of the judgment; and

a pulse train output unit which latches the specified signal at a predetermined timing of the second cycle of the reference clock, and outputs a pulse train of a desired frequency.

22. (New) The variable-frequency generator of claim 21, wherein said second reference value is half of said first reference value.

23. (New) The variable-frequency generator of claim 21, wherein said first condition is a $0 \leq$ addition result < second reference value condition, said second condition is a second reference value $\leq$ addition result < first reference value condition, said third condition is a first reference value $\leq$ addition result < (second reference value x 3) condition, and said fourth condition is a (second reference value x 3) $\leq$ addition result condition.

24. (New) The variable-frequency generator of claim 21, further comprising a third comparison unit which compares the data latched by the data holding unit and the first reference value, and when a fifth condition is satisfied, judges that the overflow has occurred.

25. (New) The variable-frequency generator of claim 24, wherein said fifth condition is a latched data > first reference value condition.

26. (New) The variable-frequency generator of claim 24, further comprising an overflow prevention unit which outputs the overflow prevention signal at a predetermined timing of the first cycle of the reference clock, when the third comparison unit has judged that the overflow has occurred.